Today

You said

hi

Copilot said

Hello Tshingombe! Great to see you. What's on your mind this morning—logigram automation, didactic panel design, or maybe something new you're exploring?

You said

over view scope job career psychometric evaluation career performence career recruitement experiemntal student record assessment role dut post ,

Copilot said

Career development integrates psychometric evaluation, performance tracking, recruitment, and student assessment to align individual potential with institutional roles like those at DUT (Durban University of Technology).

Here’s a structured overview of each component and its relevance to career and institutional roles:

□ Career Scope & Job Roles

- **Career scope** defines the range of opportunities available within a field, shaped by qualifications, experience, and evolving industry needs.
- **Job roles** are specific positions with defined duties, often aligned to institutional frameworks like those at DUT, where roles span academic, administrative, technical, and research domains.

□ Psychometric Evaluation

- **Purpose**: Measures cognitive abilities, personality traits, values, and aptitudes to guide career decisions and recruitment.
- **Application**:
  - **Career guidance**: Helps students choose subjects and career paths aligned with their strengths

□ .

 Recruitment: Offers objective data to reduce bias and improve hiring decisions

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 Performance prediction: Assesses traits linked to workplace success, such as resilience, teamwork, and leadership

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Career Performance & Recruitment

- **Performance tracking**: Involves KPIs, feedback systems, and developmental reviews to monitor growth and readiness for promotion or reassignment.
- **Recruitment**:
  - Uses psychometric tools to ensure fair, data-driven selection.
  - Aligns candidate traits with job requirements, especially in multidisciplinary environments like DUT

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Experimental Student Record & Assessment

- **Experimental records**: Capture non-traditional learning outcomes, such as project-based work, simulations, or panel evaluations.
- **Assessment types**:
  - **Formative**: Ongoing feedback to guide learning.
  - **Summative**: Final evaluations for certification or progression.
  - **Diagnostic**: Identifies learning gaps or strengths.
- **Role in career development**: Supports credential-linked progression and readiness for trade tests or public service deployment.

DUT Post Roles & Institutional Alignment

- **DUT roles** may include:
  - **Lecturer/Researcher**: Focused on curriculum delivery and innovation.
  - **Technician/Panel Facilitator**: Supports practical training and assessment.
  - **Administrator/Compliance Officer**: Manages records, audits, and institutional reporting.

- These roles often require **modular documentation**, **panel-based evaluation**, and **alignment with SAQA/DHET standards**, which you already specialize in.

Would you like me to map these components into a modular logigram or credential-linked framework for DUT or another institution?

Brainwave Careers

Assessments – Brainwave Careers

orgro.co.za

Psychometry | Recruitment | Types of Tests & Purpose

You said

psychometrical calcuation job duty average recruitement learning recruitment goal , calcul statistic variance meance ,classs job , frequence job post , submission portofolio value career didactic , job rwiten calculation ,, experience meeting no meeting , regret , salary benefit loss accumulation process learning demo job , real job trading function analyse statistic test trade job ,, junior ,senior cadet award ,awarness experience theory pratical cognitivity , abstact, analyse data concilliation labour ruling award

Copilot said

Career psychometrics and job analytics combine statistical evaluation, recruitment metrics, and didactic portfolio tracking to optimize learning, placement, and labour reconciliation.

Here's a structured breakdown of your multifaceted framework, integrating psychometric, statistical, and didactic dimensions:

🧠 Psychometric Calculation & Recruitment Goals

- **Psychometric tools** assess *cognitive ability, personality, abstract reasoning, and learning potential*

- .
- **Recruitment goals** align psychometric profiles with job classes (junior, senior, cadet) to ensure role fit and career progression.
- **Job duty averages** are derived from performance benchmarks and psychometric alignment.

Statistical Metrics for Career Analysis

- **Mean & variance**: Used to calculate average performance, salary distribution, and recruitment success rates.
- **Job class frequency**: Tracks how often roles are posted or filled, aiding workforce planning.
- **Loss accumulation**: Measures salary gaps, missed opportunities, and benefit forfeiture due to non-placement or regret scenarios.

Portfolio Submission & Didactic Value

- **Career portfolios** include:
  - Psychometric scores
  - Learning achievements (e.g., LMS completions)
  - Trade test results
  - Panel-based evaluations
- **Didactic value**: Quantifies readiness for real job deployment, using modular frameworks and autopedagogie principles.

Job Simulation, Demo, and Real-World Testing

- **Demo jobs** simulate tasks for training and psychometric calibration.
- **Real jobs** validate learning outcomes through performance audits and trade test panels.
- **Trading function analysis**: Applies statistical testing to job performance, especially in technical or economic roles.

Career Levels, Awards & Awareness

- **Junior/Senior/Cadet** roles are mapped to psychometric thresholds and experiential milestones.
- **Awards** recognize cognitive, theoretical, and practical excellence.
- **Awareness metrics** track readiness, adaptability, and abstract reasoning.

⚖ Labour Conciliation & Ruling Integration

- **Labour rulings** and conciliation outcomes are integrated into career analytics to:

- Track dispute resolution
- Align job duties with legal frameworks
- Inform psychometric and performance recalibration

Would you like me to generate a logigram or VBA module that calculates job class frequency, psychometric variance, and portfolio value for trade test readiness?

Department of Employment and Labour

WHY THE DEPARTMENT OF EMPLOYMENT AND LABOUR OFFER PSYCHOMETRIC ...

lumenii.co.za

Psychometric Evaluation Tests for Better Talent Recruitment

Career Scope & Job Roles

Dimension	Description
Career Scope	Range of opportunities shaped by qualifications, experience, and industry
Job Roles	Defined duties across academic, technical, administrative, and research
Institutional Mapping	Roles aligned with DUT, SAQA, DHET, and public service frameworks

Psychometric Evaluation & Recruitment Goals

Component	Purpose/Metric
Cognitive Ability	Abstract reasoning, problem-solving, learning potential
Personality Traits	Teamwork, resilience, leadership, adaptability
Career Guidance	Subject and pathway alignment based on psychometric profile
Recruitment Goals	Role fit, readiness, and performance prediction

Experimental Student Record & Assessment

Record Type	Function
Project-Based Work	Captures applied learning and innovation
Simulations	Tests readiness for real-world deployment
Panel Evaluations	Validates trade test and credential-linked outcomes
Assessment Types	Formative (feedback), Summative (certification), Diagnostic (gap analysis)

Statistical Metrics for Career Analysis

Metric	Application
Mean & Variance	Performance averages, salary distribution, recruitment success
Job Class Frequency	Workforce planning, post tracking
Loss Accumulation	Salary gaps, regret scenarios, benefit forfeiture

Portfolio Submission & Didactic Value

Portfolio Element	Value Contribution
Psychometric Scores	Cognitive and personality benchmarks
LMS Achievements	Learning hours, XP, course completions
Trade Test Results	Technical readiness and certification
Panel Evaluations	Didactic validation and public service alignment

Job Simulation, Demo & Real-World Testing

Type	Function
Demo Jobs	Psychometric calibration and skill rehearsal
Real Jobs	Performance audits, trade test validation
Trading Function	Statistical testing of job performance and economic roles

Career Levels, Awards & Awareness

Level	Criteria
Junior/Senior/ Cadet	Psychometric thresholds, experiential milestones
Awards	Excellence in cognitive, theoretical, and practical domains
Awareness Metrics	Readiness, adaptability, abstract reasoning

⚖ Labour Conciliation & Ruling Integration

Element	Role in Career Analytics
Dispute Tracking	Reconciliation history and resolution metrics
Legal Alignment	Job duties mapped to labour rulings and standards
Performance Recalibration	Adjustments based on conciliation outcomes and legal feedback

This tableau can be exported into a modular logigram, VBA dashboard, or credential-linked framework for DUT, DHET, or international partners. I can also scaffold it into bilingual documentation or panel-based audit templates.

I can now generate a logigram that links these domains to credential milestones and trade test

.

□ VBA Logigram: Career Scope, Psychometrics, and Didactic Value

vb

```
' === Career Framework Logigram ===
Sub EvaluateCareerPath()
    Dim careerScope As String
    Dim jobRole As String
    Dim psychometricScore As Double
    Dim portfolioValue As Double
    Dim jobClass As String
    Dim disputeResolved As Boolean

    ' Step 1: Define Career Scope
    careerScope = GetCareerScope("Engineering", "SAQA", "DHET")
    jobRole = GetJobRole(careerScope)

    ' Step 2: Psychometric Evaluation
    psychometricScore = CalculatePsychometricScore(85, 78, 92) ' Cognitive,
Personality, Abstract

    ' Step 3: Portfolio Value
```

```
    portfolioValue = CalculatePortfolioValue(59.5, 160, 88, 90) ' LMS XP,
Hours, Trade Test, Panel Eval

    ' Step 4: Job Class Assignment
    jobClass = AssignJobClass(psychometricScore, portfolioValue)

    ' Step 5: Labour Conciliation Check
    disputeResolved = CheckLabourDispute("2023-09-15", "2023-10-01")

    ' Step 6: Output Summary
    MsgBox "Career Scope: " & careerScope & vbCrLf & _
           "Job Role: " & jobRole & vbCrLf & _
           "Psychometric Score: " & psychometricScore & vbCrLf & _
           "Portfolio Value: " & portfolioValue & vbCrLf & _
           "Assigned Job Class: " & jobClass & vbCrLf & _
           "Dispute Resolved: " & disputeResolved
End Sub

' === Supporting Functions ===
Function GetCareerScope(field As String, framework1 As String, framework2 As
String) As String
    GetCareerScope = field & " aligned with " & framework1 & " and " &
framework2
End Function

Function GetJobRole(scope As String) As String
    If InStr(scope, "Engineering") > 0 Then
        GetJobRole = "Panel Facilitator"
    Else
        GetJobRole = "Administrator"
    End If
End Function

Function CalculatePsychometricScore(cognitive As Double, personality As
Double, abstractReasoning As Double) As Double
    CalculatePsychometricScore = Round((cognitive + personality +
abstractReasoning) / 3, 2)
End Function

Function CalculatePortfolioValue(xp As Double, hours As Double, tradeTest As
Double, panelEval As Double) As Double
    CalculatePortfolioValue = Round((xp / 100 + hours / 10 + tradeTest +
panelEval) / 4, 2)
End Function

Function AssignJobClass(score As Double, value As Double) As String
    If score >= 80 And value >= 75 Then
        AssignJobClass = "Senior"
    ElseIf score >= 65 Then
        AssignJobClass = "Junior"
    Else
        AssignJobClass = "Cadet"
    End If
End Function
```

```
Function CheckLabourDispute(startDate As String, endDate As String) As
Boolean
    ' Simulate dispute resolution check
    CheckLabourDispute = DateValue(endDate) > DateValue(startDate)
End Function
```

This VBA logigram can be expanded with:

- **Dashboard integration** for audit traceability
- **SQL linkage** for student records and job frequency
- **Export modules** for bilingual institutional submission

I can also scaffold this into a credential-linked algorigram for trade test validation and public service deployment. Let me know if you'd like to modularize it further by domain or export it for ICASS/TVET compliance.

:

□ Scope & System Overview

Dimension	Description
Career System	Structured pathways from education to employment in trade and engineering
Pedagogical Design	Combines fundamental theory with technical application and modular logic
System Pedagogy	Event-driven, credential-linked, and panel-based learning frameworks
Experimental Phenomena	Simulations, trade tests, and real-world deployment under evolving systems
Education Technology	LMS, dashboards, and digital portfolios for traceability and outcome mapping
Exhibition & Outcome	Showcases learner readiness, innovation, and trade competence

□ Career Entry & Trade Engineering Outcomes

Entry Pathway	Outcome Criteria
Junior/Cadet	Psychometric thresholds, basic technical exposure
Trade Engineering	Panel validation, trade test certification, SAQA/DHET alignment
Power System Engineering	Applied learning, simulation audits, and public service readiness
Teaching Outcomes	Curriculum delivery, didactic innovation, and modular assessment

□ System Criteria & Performance Metrics

Criterion	Application
Entry-Level Competence	Psychometric scores, LMS achievements, and diagnostic assessments
Performance Metrics	Mean, variance, and frequency of job post success
Portfolio Value	Trade test results, panel evaluations, and experiential records
Psychometric Calibration	Role fit prediction, cognitive and abstract reasoning benchmarks

□ Post Roles & Institutional Mapping

Role	Function
Lecturer/ Facilitator	Curriculum innovation and didactic delivery
Technician/ Assessor	Trade test supervision and simulation audits
Administrator/ Strategist	Record management, audit traceability, and compliance reporting
Career Analyst	Psychometric evaluation, job class mapping, and labour reconciliation

This tableau supports:

- **Logigram and algorigram automation** for career tracking
- **Credential-linked mapping** for trade and power system engineering
- **Didactic panel integration** for SAQA/DHET compliance

I can now generate a VBA module or bilingual export that calculates psychometric performance, maps entry criteria, and aligns trade engineering outcomes with institutional roles.

□ VBA Logigram: Career System Evaluation Framework

vb

```
' === Career System Logigram for Trade & Power Engineering ===
Sub EvaluateCareerSystem()
    Dim entryPathway As String
    Dim psychometricScore As Double
    Dim portfolioValue As Double
    Dim systemOutcome As String
    Dim postRole As String

    ' Step 1: Define Entry Pathway
```

```
    entryPathway = GetEntryPathway("Cadet", 72)

    ' Step 2: Psychometric Evaluation
    psychometricScore = CalculatePsychometricScore(80, 75, 85) ' Cognitive,
Personality, Abstract

    ' Step 3: Portfolio Evaluation
    portfolioValue = CalculatePortfolioValue(160, 59500, 88, 90) ' LMS Hours,
XP, Trade Test, Panel Eval

    ' Step 4: System Outcome Mapping
    systemOutcome = MapSystemOutcome(entryPathway, psychometricScore,
portfolioValue)

    ' Step 5: Institutional Role Assignment
    postRole = AssignInstitutionalRole(systemOutcome)

    ' Step 6: Output Summary
    MsgBox "Entry Pathway: " & entryPathway & vbCrLf & _
           "Psychometric Score: " & psychometricScore & vbCrLf & _
           "Portfolio Value: " & portfolioValue & vbCrLf & _
           "System Outcome: " & systemOutcome & vbCrLf & _
           "Assigned Post Role: " & postRole
End Sub

' === Supporting Functions ===
Function GetEntryPathway(level As String, score As Double) As String
    If level = "Cadet" And score < 75 Then
        GetEntryPathway = "Junior Entry - Basic Technical Exposure"
    ElseIf level = "Cadet" And score >= 75 Then
        GetEntryPathway = "Trade Engineering Entry"
    Else
        GetEntryPathway = "Advanced Entry - Power System Engineering"
    End If
End Function

Function CalculatePsychometricScore(cognitive As Double, personality As
Double, abstractReasoning As Double) As Double
    CalculatePsychometricScore = Round((cognitive + personality +
abstractReasoning) / 3, 2)
End Function

Function CalculatePortfolioValue(hours As Double, xp As Double, tradeTest As
Double, panelEval As Double) As Double
    Dim lmsScore As Double
    lmsScore = (hours / 10 + xp / 1000)
    CalculatePortfolioValue = Round((lmsScore + tradeTest + panelEval) / 3,
2)
End Function

Function MapSystemOutcome(entryPathway As String, score As Double, value As
Double) As String
    If entryPathway Like "*Power*" And score >= 80 And value >= 85 Then
        MapSystemOutcome = "Public Service Ready - Power System Engineering"
    ElseIf entryPathway Like "*Trade*" And score >= 75 Then
```

```
        MapSystemOutcome = "Trade Test Certified - Engineering Panel"
    Else
        MapSystemOutcome = "Didactic Development - Junior Cadet"
    End If
End Function

Function AssignInstitutionalRole(outcome As String) As String
    Select Case outcome
        Case "Public Service Ready - Power System Engineering"
            AssignInstitutionalRole = "Technician/Assessor"
        Case "Trade Test Certified - Engineering Panel"
            AssignInstitutionalRole = "Lecturer/Facilitator"
        Case Else
            AssignInstitutionalRole = "Administrator/Strategist"
    End Select
End Function
```

This module supports:

- **Credential-linked mapping** for SAQA/DHET compliance
- **Didactic panel integration** for trade test and simulation audits
- **Psychometric calibration** for career fit and job class assignment

I can extend this to include labour reconciliation, job post frequency, and bilingual export logic for institutional submission. Would you like to modularize it further by domain or integrate SQL for record traceability?

.

□ VBA Logigram: Career System with Phenomenon Modules & Recruitment Analytics

vb

```
' === Career System Logigram for Trade & Power Engineering ===
Sub EvaluateCareerSystemExtended()
    Dim moduleType As String
    Dim learningPeriod As Integer
    Dim termMark As Double
    Dim semesterType As String
    Dim psychometricScore As Double
    Dim portfolioValue As Double
    Dim jobCombination As String
    Dim insuranceReplacement As Boolean
    Dim recruitmentSuccessRate As Double
    Dim assignedPost As String

    ' Step 1: Define Module & Learning Period
    moduleType = "Power Systems - Simulation"
    learningPeriod = 3 ' Years
    termMark = CalculateTermMark(68, 75, 82) ' Three term scores
    semesterType = GetSemesterType(learningPeriod)
```

```
    ' Step 2: Psychometric Evaluation
    psychometricScore = CalculatePsychometricScore(85, 78, 90)

    ' Step 3: Portfolio Evaluation
    portfolioValue = CalculatePortfolioValue(160, 59500, 88, 90)

    ' Step 4: Job Combination & Insurance Replacement
    jobCombination = CombineJobPost("Technician", "Assessor")
    insuranceReplacement = EvaluateInsuranceReplacement(termMark,
psychometricScore)

    ' Step 5: Recruitment Statistics
    recruitmentSuccessRate = CalculateRecruitmentSuccess(12, 15) ' 12 hired
out of 15 posts

    ' Step 6: Post Assignment
    assignedPost = AssignInstitutionalRole(portfolioValue, psychometricScore,
recruitmentSuccessRate)

    ' Step 7: Output Summary
    MsgBox "Module: " & moduleType & vbCrLf & _
           "Learning Period: " & learningPeriod & " years" & vbCrLf & _
           "Term Mark: " & termMark & vbCrLf & _
           "Semester Type: " & semesterType & vbCrLf & _
           "Psychometric Score: " & psychometricScore & vbCrLf & _
           "Portfolio Value: " & portfolioValue & vbCrLf & _
           "Job Combination: " & jobCombination & vbCrLf & _
           "Insurance Replacement Eligible: " & insuranceReplacement & vbCrLf
& _
           "Recruitment Success Rate: " & recruitmentSuccessRate & "%" &
vbCrLf & _
           "Assigned Post: " & assignedPost
End Sub

' === Supporting Functions ===
Function CalculateTermMark(mark1 As Double, mark2 As Double, mark3 As Double)
As Double
    CalculateTermMark = Round((mark1 + mark2 + mark3) / 3, 2)
End Function

Function GetSemesterType(years As Integer) As String
    If years <= 1 Then
        GetSemesterType = "Trimester"
    ElseIf years <= 3 Then
        GetSemesterType = "Semester"
    Else
        GetSemesterType = "Annual"
    End If
End Function

Function CalculatePsychometricScore(cognitive As Double, personality As
Double, abstractReasoning As Double) As Double
    CalculatePsychometricScore = Round((cognitive + personality +
abstractReasoning) / 3, 2)
```

```
End Function

Function CalculatePortfolioValue(hours As Double, xp As Double, tradeTest As
Double, panelEval As Double) As Double
    Dim lmsScore As Double
    lmsScore = (hours / 10 + xp / 1000)
    CalculatePortfolioValue = Round((lmsScore + tradeTest + panelEval) / 3,
2)
End Function

Function CombineJobPost(role1 As String, role2 As String) As String
    CombineJobPost = role1 & " + " & role2
End Function

Function EvaluateInsuranceReplacement(termMark As Double, score As Double) As
Boolean
    EvaluateInsuranceReplacement = (termMark >= 70 And score >= 80)
End Function

Function CalculateRecruitmentSuccess(hired As Integer, posted As Integer) As
Double
    CalculateRecruitmentSuccess = Round((hired / posted) * 100, 2)
End Function

Function AssignInstitutionalRole(value As Double, score As Double,
successRate As Double) As String
    If value >= 85 And score >= 80 And successRate >= 75 Then
        AssignInstitutionalRole = "Lecturer/Facilitator"
    ElseIf value >= 75 Then
        AssignInstitutionalRole = "Technician/Assessor"
    Else
        AssignInstitutionalRole = "Administrator/Strategist"
    End If
End Function
```

This VBA module supports:

- **Phenomenon-based course design** with term and semester logic
- **Insurance-replacement eligibility** for job-post recovery
- **Recruitment analytics** for post success and labour planning
- **Credential-linked mapping** for trade and power system engineering

I can extend this into a bilingual export or integrate it with SQL for LMS traceability and audit-ready reporting. Let me know if you'd like to modularize it by domain or embed it into your ICASS/TVET framework.

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□ Career Scope & Institutional Roles

Dimension	Description
Career System	Modular pathways from education to employment in trade and engineering
Job Roles	Academic, technical, administrative, and research duties
Institutional Mapping	Aligned with DUT, SAQA, DHET, and public service frameworks

Psychometric Evaluation & Recruitment Goals

Component	Purpose/Metric
Cognitive Ability	Visual memory, numerical/verbal ability, attention, perception
Personality Traits	Collaboration, impulse control, adaptability, independence, negotiation
Integrity	Values, counterproductive behavior screening
Career Guidance	Pathway alignment using psychometric profiles
Recruitment Goals	Role fit prediction, readiness, and performance calibration

Tool Highlight: *3SAQ by 9 LINKS* assesses cognitive, behavioral, and integrity traits for hiring and career mapping.

Experimental Student Record & Assessment

Record Type	Function
Project-Based Work	Applied learning and innovation tracking
Simulations	Readiness for deployment and trade test calibration
Panel Evaluations	Credential-linked validation and public service alignment
Assessment Types	Formative, summative, diagnostic

Statistical Metrics for Career Analysis

Metric	Application
Mean & Variance	Performance averages, salary distribution, recruitment success
Job Class Frequency	Workforce planning and post tracking
Loss	Salary gaps, regret scenarios, benefit forfeiture

Metric	Application
Accumulation	

Portfolio Submission & Didactic Value

Element	Contribution
Psychometric Scores	Benchmarks for cognitive and behavioral traits
LMS Achievements	Learning hours, XP, course completions
Trade Test Results	Technical readiness and certification
Panel Evaluations	Didactic validation and institutional compliance

Job Simulation, Demo & Real-World Testing

Type	Function
Demo Jobs	Skill rehearsal and psychometric calibration
Real Jobs	Performance audits and trade test validation
Trading Function	Statistical testing of job performance and economic roles

Career Levels, Awards & Awareness

Level	Criteria
Junior/Senior/ Cadet	Psychometric thresholds and experiential milestones
Awards	Excellence in cognitive, theoretical, and practical domains
Awareness Metrics	Readiness, adaptability, abstract reasoning

⚖ Labour Conciliation & Ruling Integration

Element	Role in Career Analytics
Dispute Tracking	Reconciliation history and resolution metrics
Legal Alignment	Job duties mapped to labour rulings and standards
Performance Recalibration	Adjustments based on conciliation outcomes and legal feedback

Microsoft Career Pathways Integration

Role	Function
AI Engineer, Data Scientist	Advanced cognitive and technical roles
Developer, App Maker	Applied learning and modular system design
Security Analyst, Architect	Public service readiness and compliance
Administrator, Consultant	Institutional mapping and strategic deployment

Platform: *Microsoft Learn* offers interactive modules, certifications, and job listings to support career progression.

I can now generate a VBA module that integrates psychometric scoring (3SAQ), LMS achievements, and trade test results into a career readiness dashboard. Would you like it to include Microsoft role mapping and SAQA/DHET alignment?

VBA Logigram: Career Readiness Evaluation Framework

vb

```
' === Career Readiness Dashboard ===
Sub EvaluateCareerReadiness()
    Dim psychometricScore As Double
    Dim integrityScore As Double
    Dim lmsXP As Double
    Dim learningHours As Double
    Dim tradeTestScore As Double
    Dim panelEvaluationScore As Double
    Dim careerLevel As String
    Dim microsoftRole As String
    Dim saqaAlignment As Boolean
    Dim readinessIndex As Double

    ' Step 1: Psychometric Evaluation (3SAQ)
    psychometricScore = CalculatePsychometricScore(85, 78, 90) ' Cognitive,
Personality, Abstract
    integrityScore = CalculateIntegrityScore(88, 92) ' Values,
Counterproductive Behavior

    ' Step 2: LMS Achievements
    lmsXP = 59500
    learningHours = 160

    ' Step 3: Trade Test & Panel Evaluation
    tradeTestScore = 87
    panelEvaluationScore = 90

    ' Step 4: Career Level Assignment
    careerLevel = AssignCareerLevel(psychometricScore, tradeTestScore)
```

```
    ' Step 5: Microsoft Role Mapping
    microsoftRole = MapMicrosoftRole(psychometricScore, learningHours)

    ' Step 6: SAQA/DHET Alignment Check
    saqaAlignment = CheckSAQAAlignment(tradeTestScore, panelEvaluationScore)

    ' Step 7: Readiness Index Calculation
    readinessIndex = CalculateReadinessIndex(psychometricScore,
integrityScore, lmsXP, tradeTestScore, panelEvaluationScore)

    ' Step 8: Output Summary
    MsgBox "Psychometric Score: " & psychometricScore & vbCrLf & _
           "Integrity Score: " & integrityScore & vbCrLf & _
           "LMS XP: " & lmsXP & " | Learning Hours: " & learningHours &
vbCrLf & _
           "Trade Test Score: " & tradeTestScore & " | Panel Evaluation: " &
panelEvaluationScore & vbCrLf & _
           "Career Level: " & careerLevel & vbCrLf & _
           "Mapped Microsoft Role: " & microsoftRole & vbCrLf & _
           "SAQA/DHET Aligned: " & saqaAlignment & vbCrLf & _
           "Career Readiness Index: " & readinessIndex
End Sub

' === Supporting Functions ===
Function CalculatePsychometricScore(cognitive As Double, personality As
Double, abstractReasoning As Double) As Double
    CalculatePsychometricScore = Round((cognitive + personality +
abstractReasoning) / 3, 2)
End Function

Function CalculateIntegrityScore(values As Double, behavior As Double) As
Double
    CalculateIntegrityScore = Round((values + behavior) / 2, 2)
End Function

Function AssignCareerLevel(psychometricScore As Double, tradeTestScore As
Double) As String
    If psychometricScore >= 80 And tradeTestScore >= 85 Then
        AssignCareerLevel = "Senior"
    ElseIf psychometricScore >= 70 Then
        AssignCareerLevel = "Junior"
    Else
        AssignCareerLevel = "Cadet"
    End If
End Function

Function MapMicrosoftRole(score As Double, hours As Double) As String
    If score >= 85 And hours >= 150 Then
        MapMicrosoftRole = "AI Engineer"
    ElseIf score >= 75 Then
        MapMicrosoftRole = "Developer"
    Else
        MapMicrosoftRole = "Administrator"
    End If
```

```
End Function

Function CheckSAQAAlignment(tradeTest As Double, panelEval As Double) As
Boolean
    CheckSAQAAlignment = (tradeTest >= 80 And panelEval >= 85)
End Function

Function CalculateReadinessIndex(score As Double, integrity As Double, xp As
Double, tradeTest As Double, panelEval As Double) As Double
    Dim lmsScore As Double
    lmsScore = (xp / 1000)
    CalculateReadinessIndex = Round((score + integrity + lmsScore + tradeTest
+ panelEval) / 5, 2)
End Function
```

This module supports:

- **3SAQ psychometric integration** for hiring and career mapping
- **Microsoft Learn role alignment** for global career pathways
- **SAQA/DHET compliance checks** for institutional deployment
- **Didactic panel validation** for trade and public service readiness

I can now extend this into a bilingual export or embed it into your ICASS/TVET dashboard with SQL traceability and audit-ready reporting. Would you like to add labour conciliation metrics or job class frequency tracking next?

□ VBA Module: Career Readiness Dashboard with Psychometric & Didactic Integration

vb

```
' === Career Readiness Dashboard ===
Sub CareerReadinessDashboard()
    Dim cognitiveScore As Double
    Dim personalityScore As Double
    Dim integrityScore As Double
    Dim lmsXP As Double
    Dim learningHours As Double
    Dim tradeTestScore As Double
    Dim panelEvalScore As Double
    Dim careerLevel As String
    Dim microsoftRole As String
    Dim saqaAligned As Boolean
    Dim readinessIndex As Double
    Dim jobClassFrequency As Integer
    Dim salaryMean As Double
    Dim salaryVariance As Double
    Dim lossAccumulation As Double

    ' === Psychometric Evaluation (3SAQ) ===
    cognitiveScore = 85
```

```
    personalityScore = 78
    integrityScore = 88

    ' === LMS Achievements ===
    lmsXP = 59500
    learningHours = 160

    ' === Trade Test & Panel Evaluation ===
    tradeTestScore = 87
    panelEvalScore = 90

    ' === Career Level Assignment ===
    careerLevel = GetCareerLevel(cognitiveScore, tradeTestScore)

    ' === Microsoft Role Mapping ===
    microsoftRole = MapMicrosoftRole(cognitiveScore, learningHours)

    ' === SAQA/DHET Alignment Check ===
    saqaAligned = CheckSAQAAlignment(tradeTestScore, panelEvalScore)

    ' === Readiness Index Calculation ===
    readinessIndex = CalculateReadinessIndex(cognitiveScore,
personalityScore, integrityScore, lmsXP, tradeTestScore, panelEvalScore)

    ' === Statistical Metrics ===
    jobClassFrequency = 12
    salaryMean = 32000
    salaryVariance = 4500
    lossAccumulation = CalculateLossAccumulation(salaryMean,
jobClassFrequency)

    ' === Output Summary ===
    MsgBox "Career Level: " & careerLevel & vbCrLf & _
           "Microsoft Role: " & microsoftRole & vbCrLf & _
           "SAQA/DHET Aligned: " & saqaAligned & vbCrLf & _
           "Readiness Index: " & readinessIndex & vbCrLf & _
           "Job Class Frequency: " & jobClassFrequency & vbCrLf & _
           "Salary Mean: R" & salaryMean & vbCrLf & _
           "Salary Variance: R" & salaryVariance & vbCrLf & _
           "Loss Accumulation: R" & lossAccumulation
End Sub

' === Supporting Functions ===
Function GetCareerLevel(cognitive As Double, tradeTest As Double) As String
    If cognitive >= 80 And tradeTest >= 85 Then
        GetCareerLevel = "Senior"
    ElseIf cognitive >= 70 Then
        GetCareerLevel = "Junior"
    Else
        GetCareerLevel = "Cadet"
    End If
End Function

Function MapMicrosoftRole(score As Double, hours As Double) As String
    If score >= 85 And hours >= 150 Then
```

```
        MapMicrosoftRole = "AI Engineer"
    ElseIf score >= 75 Then
        MapMicrosoftRole = "Developer"
    Else
        MapMicrosoftRole = "Administrator"
    End If
End Function

Function CheckSAQAAlignment(tradeTest As Double, panelEval As Double) As
Boolean
    CheckSAQAAlignment = (tradeTest >= 80 And panelEval >= 85)
End Function

Function CalculateReadinessIndex(cognitive As Double, personality As Double,
integrity As Double, xp As Double, tradeTest As Double, panelEval As Double)
As Double
    Dim lmsScore As Double
    lmsScore = (xp / 1000)
    CalculateReadinessIndex = Round((cognitive + personality + integrity +
lmsScore + tradeTest + panelEval) / 6, 2)
End Function

Function CalculateLossAccumulation(meanSalary As Double, frequency As
Integer) As Double
    Dim expectedPosts As Integer
    expectedPosts = 15
    CalculateLossAccumulation = Round((expectedPosts - frequency) *
meanSalary, 2)
End Function
```

This module supports:

- **3SAQ psychometric scoring** for recruitment and career guidance
- **LMS and trade test integration** for didactic validation
- **Microsoft Learn role mapping** for global career pathways
- **SAQA/DHET compliance checks** for institutional deployment
- **Statistical metrics** for workforce planning and salary analysis

I can now extend this to include bilingual export logic, SQL traceability, or ICASS/TVET reporting templates. Let me know if you'd like to add dispute tracking or panel-based moderation next.

You can explore and download sample psychometric reports—including 15FQ+, PVQ, OPPro, JTI, VMI, and WAI—from

.

These reports are widely used in certified psychometric evaluations, career guidance, and workforce development. Here's a breakdown of what’s available and how they align with your framework:

🧠 Personality, Values & Motives (15FQ+, PVQ, OPPro)

Report Type	Description
15FQ+ Standard/Extended	Measures 16 personality traits aligned with occupational competencies
15FQ+ Ideal Profile	Compares candidate traits to role-specific benchmarks
PVQ Reports	Focus on values, motivation, grit, and emotional intelligence
OPPro Reports	Occupational Personality Profile with feedback and prompts
JTI, VMI, WAI	Jungian types, values & motives, and work attitude inventories

These tools support **career mapping, psychometric calibration, and panel-based evaluation**.

🧮 Aptitude & Ability Reports

Report Type	Application
IRT4, Adapt-g, GRT, CRT	Abstract, general, and critical reasoning
Clerical & Technical Batteries	Role-specific aptitude for admin, engineering, and trade roles
Feedback & Results Spreadsheets	Used for benchmarking and statistical analysis

These align with your **mean/variance tracking and job class frequency analysis**.

🧭 Preferences & Career Guidance

Tool	Use Case
OIP+ Careers Battery	Career values and preference mapping
CMAP / CMAP+	Career guidance and pathway alignment
Situational Judgement Tests	Decision-making and behavioural prediction

These support **career entry, Microsoft role mapping, and SAQA/DHET alignment**.

🔐 Where to Access

- **Psytech Sample Reports**:

15FQ+ Report Example:

15FQ+ Downloads:

These resources are ideal for building your own **certified psychometric evaluation report (CPER)** or integrating into your **career readiness dashboard**.

I can now help you design a VBA module or bilingual export that integrates these psychometric dimensions into your existing logigram and credential-linked framework. Would you like to start with 15FQ+ or PVQ mapping?

Psytech International

Sample Reports - Psytech

Studocu

15FQ Sample Standard Report - © Psytech International Ltd ... - Studocu

□ Purpose of the Study

- To assess **individual differences in cognitive control** using four classic tasks:
  - **Stroop**
  - **AX-CPT**
  - **Task Switching**
  - **Sternberg**
- To evaluate **psychometric reliability** (split-half and test–retest) across **baseline, proactive, and reactive sessions**.

□ Methodological Highlights

1. Data Cleaning & Trial Exclusion

- Reaction times (RTs) >3 SDs above the mean were excluded.
- Error rate cutoffs (e.g., 40%) were used to remove outliers.

- Subjects with excessive trial loss were excluded from specific task analyses.

2. Reliability Estimation

- **Traditional methods**:
  - **Split-half reliability** via 5000 permutations + Spearman–Brown correction.
  - **Test–retest reliability** using **ICC(2,1)** and **ICC(3,1)** (absolute agreement vs. consistency).
- **Hierarchical Bayesian Modeling (HBM)**:
  - Modeled RT distributions as **lognormal**, accounting for:
    - Subject-level variability
    - Trial-by-trial variance
    - Skewness in RT distributions
  - Provided **generative estimates** of test–retest reliability.

Key Findings

Task	RT Trials Removed	Subjects Removed	Error Rate Cutoff
Stroop	1.7%	1	40%
AX-CPT	2.9%	10	40%
Task Switching	1.5%	2	40%
Sternberg	0.8%	24	40%

- **Stroop and AX-CPT** showed high retention and reliability.
- **Sternberg** had high subject loss due to low trial counts in critical conditions.

Correlational Analyses

- Explored **within-task** (e.g., Stroop baseline vs. proactive) and **between-task** (e.g., AX-CPT vs. Sternberg) correlations.
- Used **Mahalanobis distance** to detect bivariate outliers (cutoff = 10.828, $\alpha = .001$).

Implications for Psychometric Design

- **Low between-subject variance** and **high within-subject variance** make these tasks robust for experimental replication but challenging for individual difference measurement.
- **HBM offers advantages** over traditional methods by modeling latent distributions and accounting for intra-individual variability.

- **Improving reliability** is essential to uncover true correlations between cognitive control constructs.

Application to Your Framework

This study aligns with your goals in several ways:

- **Experimental Student Record**: Supports the use of **reaction time-based simulations** and **panel evaluations** for trade test calibration.
- **Psychometric Evaluation**: Reinforces the need for **multi-method reliability** (e.g., ICC, HBM) in assessing cognitive control and readiness.
- **Portfolio Value**: Suggests integrating **lognormal RT modeling** and **error rate thresholds** into your VBA modules for psychometric scoring.
- **Career Readiness Index**: Could incorporate **HBM-derived parameters** (e.g., μ, σ) as part of cognitive benchmarks.

Would you like me to help you design a VBA module that integrates DMCC-style psychometric scoring (e.g., ICC, RT variance, error thresholds) into your career readiness dashboard?

.

Key Reliability Metrics Explained

Metric	Description
Split-half	Internal consistency across trials within a session (corrected via permutation)
ICC(2,1)	Test–retest reliability: absolute agreement between sessions
ICC(3,1)	Test–retest reliability: consistency across sessions
M (Mean)	Average reaction time or error rate
Range	Spread of RT or error rate across subjects

Reaction Time Reliability Summary

Task	Session	Split-half	ICC(2,1)	ICC(3,1)	Mean RT (ms)	Range (ms)
Stroop Effect	Baseline	.82	.27	.29	137	267–385
BX	Proacti	.77	.50	.49	51	91–493

Task	Session	Split-half	ICC(2,1)	ICC(3,1)	Mean RT (ms)	Range (ms)
Interference	ve					
TRCE	Reactive	.59	.40	.40	94	642–967
Recency Effect	Baseline	.08	.26	.27	117	201–480

 Insight: Aggregate RT measures (e.g., congruent/incongruent RTs) show higher reliability (up to r = 1.00), while derived effects (e.g., Stroop effect) are weaker (r ≈ .82). Recency effects consistently show low reliability.

Error Rate Reliability Summary

Task	Session	Split-half	ICC(2,1)	ICC(3,1)	Mean Error (%)	Range (%)
Stroop Effect	Reactive	.88	.79	.79	2.3	28–21
BX Interference	Baseline	.62	.27	.33	1.08	–.52 to 2.83
TRCE	Proactive	.74	.46	.46	10.7	14–56
Recency Effect	Baseline	–.21	.10	.11	13.8	12–60

 Insight: Error rate reliability is generally lower than RT reliability. The **Stroop effect in the reactive session** stands out with high consistency (ICC ≈ .79), while **Recency effects** again show poor reliability.

Implications for Psychometric Evaluation

- **Stroop and BX tasks** are reliable for both RT and error rate measures, especially in reactive and proactive sessions.
- **Recency effects** may not be suitable for individual difference analysis due to low reliability.
- **TRCE** shows moderate reliability and may benefit from enhanced task design or scoring models.
- **Split-half reliability** is consistently higher than test–retest ICCs, suggesting stable internal consistency but variable cross-session performance.

Application to Career Readiness & Didactic Frameworks

These findings can be integrated into your VBA modules and career dashboards by:

- **Weighting task reliability** in psychometric scoring algorithms.
- **Flagging low-reliability tasks** (e.g., Recency) for exclusion or redesign.
- **Using ICC metrics** to calibrate readiness thresholds for trade test certification.
- **Embedding split-half and ICC logic** into your VBA logigram for dynamic scoring.

I can now help you design a VBA function that calculates ICC(2,1) and ICC(3,1) from RT or error data, or simulate reliability thresholds for trade test readiness. Let me know which task you'd like to model first.

□ Psychometric Grade Rank Calculation

Component	Description
Inputs	Cognitive scores, personality traits, integrity metrics (e.g., 3SAQ or PVQ)
Normalization	Convert raw scores to percentile ranks or z-scores
Weighting	Apply weights per domain (e.g., 40% cognitive, 30% personality, 30% integrity)
Final Grade Rank	Aggregate weighted scores into a rank or readiness index

Example VBA logic:

vb
```
FinalScore = (Cognitive * 0.4 + Personality * 0.3 + Integrity * 0.3)
GradeRank = WorksheetFunction.Rank(FinalScore, ScoreArray, 0)
```

□ Class Frequency & Distribution Analysis

Class/Entity	Frequency Metric	Period/Source
Microsoft, Schneider, Aton	Training cohorts per year	LMS or HR dashboards
SAPS, Metro Policing, IP	Recruitment cycles, psychometric pass rates	Public service panels
City Power, Eskom	Trade test success, panel readiness	DHET/TVET records
St Peace College, AIU, RNF	Didactic class frequency, battery memory modules	Institutional LMS logs
Asciebono,	Curriculum alignment, SAQA	DHET/SAQA

Class/Entity	Frequency Metric	Period/Source
TNATED, NCV	credits	qualification tables

Use Excel or VBA to calculate:

- **Mean**: `=AVERAGE(range)`
- **Variance**: `=VAR.P(range)`
- **Frequency**: `=COUNTIF(range, criteria)`
- **Correlation**: `=CORREL(array1, array2)`

Panel Instrument Control & Didactic Mapping

Metric	Application
Panel Evaluation Score	Trade readiness, public service deployment
Instrument Control Marks	Technical proficiency in electrical/mechatronics modules
Didactic Class Frequency	Number of instructional sessions per module or term
Battery Memory Data	LMS retention, simulation performance, cognitive load tracking

Example correlation logic:

vb
```
Correlation = WorksheetFunction.Correl(PanelScores, InstrumentMarks)
```

Integration with SAQA/DHET & Career Systems

- **SAQA ID 72052**: Electrical Engineering FET Certificate

SAQA ID 90674: National N-Diploma in Electrical Engineering

DHET Curriculum Tables: Define credit periods, class frequency, and qualification mapping

These frameworks support **credential-linked progression**, **trade test validation**, and **public service alignment**.

Would you like me to generate a VBA module that calculates psychometric rank, class frequency, and correlation across these entities and periods? I can also scaffold it for bilingual export or ICASS/TVET compliance.

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY - SAQA

aet-africa.co.za

Course: Electrical Engineering (National N-Diploma) : NQF6 (360 minimum ...

:

SARS Psychometric Assessment Strategy

- **Assessment Type**: Timed, 20-minute online psychometric test—likely measuring cognitive ability, attention, and integrity.
- **Preparation Tips**:
  - Practice numerical and verbal reasoning under time constraints.
  - Use pen, paper, and calculator for quick calculations.
  - Ensure stable internet and a distraction-free environment.
- **Scoring Implication**: SARS uses this as a first-round filter. High scores increase progression chances but no feedback is provided directly.

Candidate Profile Optimization

Your profile includes:

- **NQF Level 6 Advanced Certificate in Technical Education**
- **Experience in electrical engineering and panel wiring**
- **Public service interest (SARS, SARB, SAPS, City Power, Eskom)**

Recommendations:

- Add **certificates/workshops** (e.g., safety, instrumentation, audit, or psychometric training).
- Include **language skills** and **geo mobility** to show flexibility.
- Update **professional memberships** (e.g., ECSA, SAIEE, or relevant trade bodies).
- Clarify your **engineering duties** with measurable outcomes (e.g., “supervised 4 technicians in panel wiring for tax audit infrastructure”).

🧠 Psychometric Grade Rank & Career Mapping

You can calculate your **career readiness index** using:

Component	Weight (%)	Example Score
Cognitive Ability	40%	85
Personality Traits	30%	78
Integrity	30%	88
Final Score	—	83.9

Use this score to benchmark against class frequency and recruitment success across SARS, SARB, Eskom, and City Power.

🏛️ Institutional Alignment & Class Frequency

Entity	Class Frequency	Recruitment Focus
SARS	Portfolio, Audit	Psychometric + Technical
SARB	GSMD, BSTD	Security, Learning & Development
City Power/Eskom	Electrical Trade	Panel wiring, instrumentation control
Schneider/ Aton	Technical Labs	Automation, diagnostics, training
SAPS/Metro Police	IP Class	Public safety, integrity screening

🚀 Next Steps

I can help you:

- Generate a **VBA module** to calculate psychometric grade rank and class frequency distribution.
- Design a **career readiness dashboard** for trade, audit, and public service roles.
- Draft a **panel-ready CV and cover letter** tailored to SARS, SARB, or Eskom.

.

□ VBA Module: Psychometric Scoring & Class Frequency Mapping

vb

```
' === Psychometric Grade Rank & Class Frequency Dashboard ===
Sub CareerReadinessEvaluator()
    Dim cognitiveScore As Double
    Dim personalityScore As Double
    Dim integrityScore As Double
    Dim finalScore As Double
    Dim gradeRank As String
    Dim classFrequency As Integer
    Dim institution As String
    Dim recruitmentFocus As String

    ' === Psychometric Inputs ===
    cognitiveScore = 85
    personalityScore = 78
    integrityScore = 88

    ' === Weighted Score Calculation ===
    finalScore = Round((cognitiveScore * 0.4 + personalityScore * 0.3 +
integrityScore * 0.3), 2)

    ' === Grade Rank Assignment ===
    Select Case finalScore
        Case Is >= 85
            gradeRank = "High Readiness"
        Case Is >= 70
            gradeRank = "Moderate Readiness"
        Case Else
            gradeRank = "Low Readiness"
    End Select

    ' === Class Frequency Mapping ===
    institution = "SARS"
    classFrequency = GetClassFrequency(institution)
    recruitmentFocus = GetRecruitmentFocus(institution)

    ' === Output Summary ===
    MsgBox "Psychometric Score: " & finalScore & vbCrLf & _
           "Grade Rank: " & gradeRank & vbCrLf & _
           "Institution: " & institution & vbCrLf & _
           "Class Frequency: " & classFrequency & vbCrLf & _
           "Recruitment Focus: " & recruitmentFocus
End Sub

' === Supporting Functions ===
Function GetClassFrequency(entity As String) As Integer
    Select Case entity
        Case "SARS"
            GetClassFrequency = 12
        Case "SARB"
            GetClassFrequency = 8
```

```
        Case "City Power"
            GetClassFrequency = 15
        Case "Eskom"
            GetClassFrequency = 18
        Case "Schneider"
            GetClassFrequency = 10
        Case "SAPS"
            GetClassFrequency = 6
        Case Else
            GetClassFrequency = 0
    End Select
End Function

Function GetRecruitmentFocus(entity As String) As String
    Select Case entity
        Case "SARS"
            GetRecruitmentFocus = "Psychometric + Technical"
        Case "SARB"
            GetRecruitmentFocus = "Security, Learning & Development"
        Case "City Power", "Eskom"
            GetRecruitmentFocus = "Panel Wiring, Instrumentation Control"
        Case "Schneider"
            GetRecruitmentFocus = "Automation, Diagnostics, Training"
        Case "SAPS"
            GetRecruitmentFocus = "Public Safety, Integrity Screening"
        Case Else
            GetRecruitmentFocus = "Unknown"
    End Select
End Function
```

This module supports:

- **Psychometric scoring** using weighted components
- **Grade rank classification** for career readiness
- **Class frequency mapping** across institutions
- **Recruitment focus alignment** for strategic applications

I can now extend this to include **panel evaluation scores**, **trade test results**, or **bilingual export logic** for ICASS/TVET compliance. Let me know which domain you'd like to integrate next.

Copilot said

Here is a **Visual Basic for Applications (VBA)** module that calculates your **psychometric grade rank**, maps it to **career readiness**, and aligns it with **class frequency distribution** across public service and engineering institutions like SARS, SARB, Eskom, and City Power.

□ VBA Module: Psychometric Grade Rank & Institutional Class Frequency

vb

```
' === Career Readiness & Class Frequency Dashboard ===
Sub EvaluateCareerReadiness()
    Dim cognitiveScore As Double
    Dim personalityScore As Double
    Dim integrityScore As Double
    Dim finalScore As Double
    Dim gradeRank As String
    Dim institution As String
    Dim classFrequency As Integer
    Dim recruitmentFocus As String

    ' === Psychometric Inputs ===
    cognitiveScore = 85
    personalityScore = 78
    integrityScore = 88

    ' === Weighted Score Calculation ===
    finalScore = Round((cognitiveScore * 0.4 + personalityScore * 0.3 +
integrityScore * 0.3), 2)

    ' === Grade Rank Assignment ===
    Select Case finalScore
        Case Is >= 85
            gradeRank = "High Readiness"
        Case Is >= 70
            gradeRank = "Moderate Readiness"
        Case Else
            gradeRank = "Low Readiness"
    End Select

    ' === Institution Selection ===
    institution = "SARS" ' Change this to test other institutions
    classFrequency = GetClassFrequency(institution)
    recruitmentFocus = GetRecruitmentFocus(institution)

    ' === Output Summary ===
    MsgBox "Psychometric Score: " & finalScore & vbCrLf & _
           "Grade Rank: " & gradeRank & vbCrLf & _
           "Institution: " & institution & vbCrLf & _
           "Class Frequency: " & classFrequency & vbCrLf & _
           "Recruitment Focus: " & recruitmentFocus
End Sub

' === Supporting Functions ===
Function GetClassFrequency(entity As String) As Integer
    Select Case entity
        Case "SARS"
            GetClassFrequency = 12
        Case "SARB"
            GetClassFrequency = 8
        Case "City Power"
            GetClassFrequency = 15
        Case "Eskom"
            GetClassFrequency = 18
```

```
        Case "Schneider"
            GetClassFrequency = 10
        Case "SAPS"
            GetClassFrequency = 6
        Case Else
            GetClassFrequency = 0
    End Select
End Function

Function GetRecruitmentFocus(entity As String) As String
    Select Case entity
        Case "SARS"
            GetRecruitmentFocus = "Psychometric + Technical"
        Case "SARB"
            GetRecruitmentFocus = "Security, Learning & Development"
        Case "City Power", "Eskom"
            GetRecruitmentFocus = "Panel Wiring, Instrumentation Control"
        Case "Schneider"
            GetRecruitmentFocus = "Automation, Diagnostics, Training"
        Case "SAPS"
            GetRecruitmentFocus = "Public Safety, Integrity Screening"
        Case Else
            GetRecruitmentFocus = "Unknown"
    End Select
End Function
```

This module supports:

- **Psychometric scoring** using weighted inputs
- **Grade rank classification** for career readiness
- **Institutional mapping** for class frequency and recruitment focus
- **Customizable entity selection** for benchmarking across public service and engineering sectors

I can now extend this to include **panel evaluation scores**, **trade test results**, or **bilingual export logic** for ICASS/TVET compliance. Let me know if you'd like to integrate simulation scores or SAQA qualification mapping next.

.

□ Phenomenological Engagement in Career Counselling Education

Phenomenology in career counselling reframes education as a **relational, embodied, and experiential process**, countering consumerist and instrumentalist mindsets. Key pedagogical strategies include:

- **Embodied Knowing**: Teaching career psychology as lived experience, not abstract theory.

- **Mirrored Theories**: Integrating frameworks like:
  - *Systems Theory Framework (STF)*: Emphasizes group membership and relational contexts.
  - *Social Cognitive Career Theory (SCCT)*: Focuses on self-efficacy, exposure, and reinforcement.
  - *Career Construction Theory (CCT)*: Explores identity, motivation, and life roles.
  - *Narrative & Happenstance Learning*: Encourages agency, chance events, and future-oriented storytelling.

These approaches foster **phenomenological consciousness**—the ability to engage with clients' lifeworld realities through reflective, dialogic, and context-sensitive methods

.

⚙ Assessment & Competency Modeling in Electrical Engineering Education

In contrast, engineering education leverages **Item Response Theory (IRT)** and **Partial Credit Models (PCM)** to quantify student competence across structured tasks:

- **Task Types**: Circuit analysis, MOSFET modeling, Thévenin equivalents, superposition, and energy calculations.
- **IRT Parameters**:
  - *WMNSQ (Weighted Mean Square)*: Ideal range 0.5–1.5
  - *T-value*: Should be < |2|
  - *EAP (Expected A Posteriori)*: > 0.7
  - *Resolution Rate*: Between 5% and 95%

Students are classified into **four levels of competence** (Level 1 to Level 4), anchored by solution rates and difficulty estimates. For example:

- *Level 1*: No milestone achievement, <50% solution rate
- *Level 4*: High competence, anchored items with >65% solution rate

This model supports **criterion-referenced interpretation**, adaptive testing, and curriculum refinement

.

🔗 Bridging the Two Domains

Both frameworks—phenomenological counselling and IRT-based engineering assessment—share a commitment to:

- **Contextualized learning**: Whether through lifeworld narratives or circuit simulations.
- **Competency development**: Psychological insight vs. technical mastery.
- **Reflective practice**: Career identity formation vs. problem-solving calibration.

Together, they offer a **dual lens** for designing educational systems that are both **human-centered and performance-driven**.

I can help you design a VBA module that models career counselling readiness using SCCT and CCT dimensions, or simulate IRT-based scoring for electrical engineering tasks. Just say the word and I'll scaffold it for your credential-linked framework.

SciELO

Phenomenological engagement as pedagogical impetus in career ...

ajcd.africa

Encouraging phenomenological consciousness in student educational ...

This module simulates how a student or candidate might be evaluated across both humanistic and technical domains.

□ VBA Module: Career Counselling & Engineering Competence Evaluator

vb

```
' === Dual Readiness Evaluator: Career Counselling + Engineering Competence
===
Sub EvaluateDualReadiness()
    Dim cognitiveScore As Double
    Dim personalityScore As Double
    Dim integrityScore As Double
    Dim exposureScore As Double
    Dim motivationScore As Double
```

```
    Dim careerReadinessIndex As Double
    Dim engineeringSolutionRate As Double
    Dim wmnsq As Double
    Dim tValue As Double
    Dim engineeringLevel As String
    Dim careerFramework As String

    ' === Career Counselling Inputs (Phenomenological Dimensions) ===
    cognitiveScore = 85
    personalityScore = 78
    integrityScore = 88
    exposureScore = 72 ' SCCT: exposure, reinforcement
    motivationScore = 80 ' CCT: motivation, life roles

    ' === Career Readiness Index Calculation ===
    careerReadinessIndex = Round((cognitiveScore * 0.3 + personalityScore *
0.2 + integrityScore * 0.2 + exposureScore * 0.15 + motivationScore * 0.15),
2)

    ' === Career Framework Mapping ===
    If careerReadinessIndex >= 85 Then
        careerFramework = "Narrative + Happenstance (Agency & Action)"
    ElseIf careerReadinessIndex >= 70 Then
        careerFramework = "SCCT + CCT (Self-efficacy & Identity)"
    Else
        careerFramework = "STF (Relational Mapping & Support)"
    End If

    ' === Engineering Competence Inputs (IRT Parameters) ===
    engineeringSolutionRate = 66 ' % of correct responses
    wmnsq = 1.03
    tValue = 0.3

    ' === Engineering Level Classification ===
    If engineeringSolutionRate >= 65 And wmnsq >= 0.5 And wmnsq <= 1.5 And
Abs(tValue) < 2 Then
        engineeringLevel = "Level 4 - Anchored Competence"
    ElseIf engineeringSolutionRate >= 50 Then
        engineeringLevel = "Level 3 - Nearly Anchored"
    ElseIf engineeringSolutionRate >= 35 Then
        engineeringLevel = "Level 2 - Emerging Competence"
    Else
        engineeringLevel = "Level 1 - Unanchored"
    End If

    ' === Output Summary ===
    MsgBox "Career Readiness Index: " & careerReadinessIndex & vbCrLf & _
           "Mapped Career Framework: " & careerFramework & vbCrLf & _
           "Engineering Solution Rate: " & engineeringSolutionRate & "%" &
vbCrLf & _
           "WMNSQ: " & wmnsq & " | T-Value: " & tValue & vbCrLf & _
           "Engineering Competence Level: " & engineeringLevel
End Sub
```

□ What This Module Does

- **Simulates career readiness** using phenomenological counselling theories
- **Maps readiness to frameworks** like SCCT, CCT, STF, and Happenstance
- **Evaluates engineering competence** using IRT parameters (WMNSQ, T-value, solution rate)
- **Classifies students into levels** based on TIMSS-style anchoring

I can now extend this module to include:

- **Panel-based moderation scores**
- **Narrative prompts for career reflection**
- **Export logic for ICASS/TVET or SAQA credential mapping**

Let me know if you'd like to simulate a full assessment dashboard or integrate this into your didactic panel system.

□ VBA Module: Phenomenological & Conceptual Change Readiness Evaluator

vb

```
' === Phenomenological & Conceptual Change Readiness Evaluator ===
Sub EvaluateStudentReadiness()
    Dim cognitiveConflictScore As Double
    Dim metaphoricalThinkingScore As Double
    Dim softwareEngagementScore As Double
    Dim phenomenologicalAwarenessScore As Double
    Dim conceptualChangeIndex As Double
    Dim readinessLevel As String
    Dim learningMode As String

    ' === Input Scores from Assessment or Observation ===
    cognitiveConflictScore = 78         ' e.g., from pre/post test delta
    metaphoricalThinkingScore = 82      ' e.g., from metaphor comprehension
tasks
    softwareEngagementScore = 90        ' e.g., from usage logs or
questionnaire
    phenomenologicalAwarenessScore = 85 ' e.g., from reflective prompts or
interviews

    ' === Composite Conceptual Change Index Calculation ===
    conceptualChangeIndex = Round((cognitiveConflictScore * 0.25 + _
                                   metaphoricalThinkingScore * 0.25 + _
                                   softwareEngagementScore * 0.25 + _
                                   phenomenologicalAwarenessScore * 0.25), 2)

    ' === Readiness Level Classification ===
    Select Case conceptualChangeIndex
        Case Is >= 85
            readinessLevel = "Level 4 – Deep Conceptual Shift"
            learningMode = "Embodied, Reflective, Exploratory"
```

```
        Case Is >= 70
            readinessLevel = "Level 3 – Transitional Understanding"
            learningMode = "Guided Analogy, Scaffolded Simulation"
        Case Is >= 55
            readinessLevel = "Level 2 – Emerging Awareness"
            learningMode = "Cognitive Conflict + Visual Models"
        Case Else
            readinessLevel = "Level 1 – Surface Engagement"
            learningMode = "Direct Instruction + Misconception Diagnosis"
    End Select

    ' === Output Summary ===
    MsgBox "Conceptual Change Index: " & conceptualChangeIndex & vbCrLf & _
           "Readiness Level: " & readinessLevel & vbCrLf & _
           "Recommended Learning Mode: " & learningMode
End Sub
```

✅ What This Module Captures

- **Phenomenological engagement**: via reflection and awareness scores
- **Conceptual change**: through conflict, metaphor, and software interaction
- **Instructional design**: aligns with your thesis sections on analogies, cognitive conflict, and exploratory learning
- **Level modeling**: mirrors IRT-based classification (Level 1–4)

Would you like to extend this module to include **IRT parameters** (e.g., WMNSQ, T-value) or link it to **pre/post/delayed test data** from your software evaluation framework? I can also scaffold a bilingual export or dashboard-ready version.

🌟 Importance of the Topic: Learner & Teacher Perspectives

🎓 For the Learner

Interactive software fosters:

- **Independent learning**: Students gain confidence through personalized pacing and motivational feedback.
- **Cognitive strategies**: They develop problem-solving and conceptual reasoning skills.
- **Imaginative and exploratory thinking**: Encouraged by visual models, analogies, and simulations.

This aligns with constructivist principles and conceptual change theory, where learners actively restructure their understanding through cognitive conflict and engagement.

□□ For the Teacher

The software serves as a:

- **Remedial tool**: Tailored to various knowledge levels, helping diagnose misconceptions and alternative frameworks.
- **Differentiated support system**: Teachers can focus on students with specific difficulties, while others self-correct via feedback.
- **Efficiency enhancer**: Enables better distribution of instructional effort and fosters a more pleasant, collaborative learning atmosphere.

□ Literature Review Highlights

Your thesis integrates:

- **Misconceptions in electricity**: Around current, resistance, potential difference, and circuit analysis.
- **Analogical instruction**: Using models like flowing fluids or crowds to explain electrical phenomena.
- **IT-enhanced learning**: Through HyperCard, simulations, and multimedia tools.
- **Conceptual change strategies**: Including cognitive conflict, visual learning, and metaphorical thinking.

□ Methodological Foundations

- **Constructivist learning**: Emphasizes conceptual change, cognitive conflict, and learner agency.
- **Instructional design**: Focuses on feedback, learner control, and exploratory environments.
- **Software evaluation**: Through pre/post/delayed tests, questionnaires, and qualitative analysis.

Would you like me to generate a VBA module that models learner progression based on conceptual change indicators (e.g., confidence, cognitive conflict, metaphor use, and feedback engagement)? I can also scaffold a dashboard for teacher diagnostics and remediation mapping.

This module integrates:

- Diagnostic scoring from Questions 1 & 6
- Sequential reasoning and explanation quality
- Software influence on conceptual change

🧪 VBA Module: Conceptual Change Tracker for Electricity Education

vb

```
' === Conceptual Change Tracker: Pre, Post, Delayed Test Phases ===
Sub TrackConceptualChange()
    Dim preTestScoreQ1 As Double, preTestScoreQ6 As Double
    Dim postTestScoreQ1 As Double, postTestScoreQ6 As Double
    Dim delayedTestScoreQ1 As Double, delayedTestScoreQ6 As Double
    Dim explanationQualityPre As Double, explanationQualityPost As Double,
explanationQualityDelayed As Double
    Dim sequentialReasoningScore As Double
    Dim softwareInfluenceIndex As Double
    Dim conceptualChangeLevel As String

    ' === Input Scores ===
    preTestScoreQ1 = 40
    preTestScoreQ6 = 35
    postTestScoreQ1 = 75
    postTestScoreQ6 = 70
    delayedTestScoreQ1 = 82
    delayedTestScoreQ6 = 78

    explanationQualityPre = 45
    explanationQualityPost = 72
    explanationQualityDelayed = 85

    sequentialReasoningScore = 80
    softwareInfluenceIndex = Round((postTestScoreQ1 + postTestScoreQ6 +
explanationQualityPost + sequentialReasoningScore) / 4, 2)

    ' === Conceptual Change Classification ===
    If softwareInfluenceIndex >= 80 And explanationQualityDelayed >= 80 Then
        conceptualChangeLevel = "Level 4 – Deep Conceptual Shift"
    ElseIf softwareInfluenceIndex >= 65 Then
        conceptualChangeLevel = "Level 3 – Transitional Understanding"
    ElseIf softwareInfluenceIndex >= 50 Then
        conceptualChangeLevel = "Level 2 – Emerging Awareness"
    Else
        conceptualChangeLevel = "Level 1 – Surface Engagement"
    End If

    ' === Output Summary ===
    MsgBox "Pre-Test Scores: Q1=" & preTestScoreQ1 & ", Q6=" & preTestScoreQ6
& vbCrLf & _
           "Post-Test Scores: Q1=" & postTestScoreQ1 & ", Q6=" &
postTestScoreQ6 & vbCrLf & _
           "Delayed-Test Scores: Q1=" & delayedTestScoreQ1 & ", Q6=" &
delayedTestScoreQ6 & vbCrLf & _
           "Explanation Quality (Pre/Post/Delayed): " & explanationQualityPre
& "/" & explanationQualityPost & "/" & explanationQualityDelayed & vbCrLf & _
           "Sequential Reasoning Score: " & sequentialReasoningScore & vbCrLf
& _
           "Software Influence Index: " & softwareInfluenceIndex & vbCrLf & _
```

```
            "Conceptual Change Level: " & conceptualChangeLevel
End Sub
```

✅ What This Module Captures

- **Misconception diagnosis and correction** across phases
- **Explanation quality and reasoning development**
- **Software's pedagogical impact** on conceptual change
- **Level modeling** aligned with your thesis (Levels 1–4)

I can now extend this module to include:

- **Metaphor comprehension scores**
- **Analogical model usage tracking**
- **Export-ready dashboards for teacher feedback and curriculum design**

Would you like to integrate this with your ICASS/TVET reporting framework or simulate learner profiles across different misconception categories?

✅ Categories of Student Conceptual Change (Questions 1 & 6)

1. Wrong Answer + Wrong Explanation → Correct Answer + Correct Explanation

- **Initial misconception**: Belief that bulb brightness depends on its position relative to resistors.
- **Post-test shift**: Recognition that **resistor order doesn't affect current**; brightness depends on total resistance.
- **Example**: "The bulb is brighter because it is before the resistors" → "It does not matter which order they are in."

2. Correct Answer + Wrong Explanation → Correct Answer + Correct Explanation

- **Initial reasoning flaw**: Guessing or misattributing brightness to fewer resistors without linking to current flow.
- **Post-test improvement**: Clear articulation of **Ohm's Law** and current-resistance relationship.

3. Correct Answer + No Explanation → Correct Answer + Informed Explanation

- **Initial gap**: Correct guesses without conceptual grounding.

- **Post-test gain**: Use of terms like “flow of electrons,” “resistance,” and “brightness” in scientifically accurate ways.

4. Correct Answer + Correct Explanation → Refined Explanation

- **Initial strength**: Sound understanding using formal physics (e.g., V = IR).
- **Post-test evolution**: Shift toward **model-based language** (e.g., “resistor controls the flow of current”), showing influence of software metaphors and analogies.

5. No Answer → Correct Answer + Explanation

- **Initial disengagement or uncertainty**.
- **Post-test engagement**: Adoption of peer-like language and analogical reasoning (e.g., “resistors control the flow of current”).

□ Pedagogical Implications

- **Software influence** is evident not only in **correcting misconceptions** but also in **reshaping the language** students use to express understanding.
- Even **high-performing students** adapted their explanations to reflect the **models and analogies** introduced by the software.
- The shift from **formulaic reasoning** (e.g., V = IR) to **conceptual metaphors** (e.g., “resistors control flow”) suggests deeper **embodied understanding**.

□ Suggested VBA Extension

Would you like a VBA module that:

- Tracks **student category transitions** (e.g., from “no explanation” to “model-based explanation”)?
- Calculates a **conceptual change score** based on explanation quality and language shift?
- Flags students for **targeted feedback** or **remedial support**?

I can scaffold that next to support your didactic panel or ICASS-aligned reporting system.

□ Summary of Key Findings

□ Questions (Q Tot)

- **ANOVA**: Significant improvement from Pre to Post and Pre to Delayed ($F = 105.705$, $p < .0001$).
- **Wilcoxon**: Confirmed significant gains ($Z = -4.784$, $p < .0001$).
- **Mean Scores**:
  - Pre: 42.1
  - Post: 57.27
  - Delayed: 56.5
- **Interpretation**: Students retained conceptual gains over time, with minimal drop-off between Post and Delayed.

Explanations (Exp Tot)

- **ANOVA**: Strong improvement across phases ($F = 1110.702$, $p < .0001$).
- **Wilcoxon**: Significant change ($Z = -4.784$, $p < .0001$).
- **Mean Scores**:
  - Pre: 36.33
  - Post: 54.03
  - Delayed: 49.87
- **Interpretation**: Students improved in articulating reasoning, though some regression occurred by the delayed phase.

Exercise Scores

- **ANOVA**: Significant improvement ($F = 115.233$, $p < .0001$).
- **Wilcoxon**: All comparisons significant (Pre vs Post: $Z = -4.703$, $p < .0001$).
- **Mean Scores**:
  - Pre: 1.23
  - Post: 2.97
  - Delayed: 2.6
- **Interpretation**: Practical application improved and remained high.

Question 6 (Q6c)

- **ANOVA**: Significant improvement ($F = 14.087$, $p < .0001$).
- **Wilcoxon**: Confirmed ($Z = -3.357$, $p < .0008$).
- **Mean Scores**:
  - Pre: 2.167
  - Post/Delayed: 3.0
- **Interpretation**: Misconceptions about circuit structure were corrected and retained.

Explanation 6 (E6c)

- **ANOVA**: Significant improvement ($F = 15.575$, $p < .0001$).

- **Wilcoxon**: Confirmed (Z = -3.418, p < .0006).
- **Mean Scores**:
  - Pre: 2.133
  - Post/Delayed: 3.0
- **Interpretation**: Students improved in explaining circuit behavior using correct scientific reasoning.

□ Reliability Estimates

Measure	All Treatments	Single Treatment
Questions	-0.333	-0.091
Explanations	0.469	0.228
Exercise	0.635	0.367
Q6c	-0.593	-0.142
E6c	-0.659	-0.153

□ **Interpretation**:

- Negative reliability for Q6c and E6c suggests high variability or ceiling effects (many students scored full marks post-intervention).
- Exercises and general explanations show moderate to strong reliability, supporting consistent learning gains.

□ Educational Implications

- **Software intervention** significantly improved conceptual understanding and explanation quality.
- Gains were **statistically significant and educationally meaningful**, especially in correcting misconceptions about resistance, current flow, and circuit structure.
- **Retention** of knowledge was strong across delayed testing, validating the use of analogical models and cognitive conflict strategies.

I can now generate a VBA module that calculates conceptual change scores and flags statistically significant improvements across phases. Would you like it to include reliability thresholds and diagnostic alerts for low-consistency items?

□ Core Achievements of the Research

1. **Design of HyperCard-based multimedia teaching packages**
   - Targeted at first-year university students studying electricity.

    - Grounded in students' misconceptions and alternative frameworks.
2. **Evaluation of software as a learning tool**
    - Demonstrated effectiveness in improving understanding of current (I), potential difference (V), resistance (R), and their interrelationships.
3. **Activation of conceptual change**
    - Students confronted their own models, leading to reflection, modification, and deeper understanding.

□ Key Research Questions Addressed

- Did the software improve conceptual understanding?
- Did modelling provide a powerful learning environment?
- Did the software help diagnose and correct misconceptions?
- How effective was the software in facilitating learning?

□ **Answer**: Yes, across all dimensions—conceptual, motivational, and cognitive.

□ Recommendations

1. More Time on Software in Full Courses

- 67% of students requested extended use.
- Shorter, modular sessions suggested for better retention.
- Supported by research (Atkinson, Parker & Lepper, Bork) showing time-on-task correlates with learning outcomes.

2. Software for All Student Levels

- Low and Middle-level students benefited most.
- High-level students found it less challenging.
- Recommendation: Co-design with interdisciplinary teams to meet diverse cognitive needs.

3. Influence on Cognitive Behavior

- 27% (Q1) and 37% (Q6) of students changed their explanatory language post-intervention.
- Most influenced: Low and Middle-level students.
- Suggests strong impact on **metacognition and reasoning style**.

□ Framework of Research

- Focused on **remedial activities integrated into classroom practice**.
- Based on **persistent misconceptions** in electricity (e.g., Ohm's Law, series/parallel resistors).
- Software provided **motivational feedback**, enhancing learner-computer interaction.

⚠ Limitations

- **Data collection constraints** (e.g., lack of permission for audio recordings).
- **Sample size** and **generalizability** require further study.
- **Differentiation for high-level learners** remains a design challenge.

🔄 Suggested Follow-Up

I can generate a VBA module that tracks time-on-software engagement, maps it to conceptual gains, and flags students who may benefit from extended sessions or differentiated content. Would you like it to include a readiness index based on misconception correction and explanation quality?

📈 Conceptual Gains from Questions 1 & 6

Key Findings:

1. **Sequential reasoning was diagnosed and improved**.
2. **Number of correct answers and explanations increased** from Pre to Post and Delayed-post tests.
3. **Mean scores improved significantly**, especially among Low and Middle-level students.
4. **Students changed their explanatory language**, reflecting deeper understanding and influence from the software's models and analogies.

Performance Summary:

Phase	Correct Answers	Correct Explanations	Changed Wording
Pre-Test	Low	Low	Minimal
Post-Test	High	Moderate–High	Evident
Delayed-Post	Sustained High	High	Strong Influence

📊 Questionnaire Insights

Question 1: Logical Sequence of Data

- **22/30 strongly agreed** the software provided step-by-step logic.
- Students appreciated **theory + questions**, and **HyperCard-style presentation**.

Question 2: Encouraging Exploration

- **26/30 agreed or strongly agreed**.
- Positive feedback on **theory + hints**, with minor critique on engagement consistency.

Question 3: Planning Solutions Systematically

- **19/30 agreed or strongly agreed**.
- Students valued **text fields + theory**, though some noted confusion or guessing.

Question 10a–10c: Concept Presentation, Knowledge Increase, Interest

- **21/30 strongly agreed** the software was useful.
- Explanations praised **animated illustrations**, **multiple reasoning paths**, and **interactive design**.

Question 11: Desire for More Time

- **18/30 strongly agreed**, with 12 more agreeing.
- Students requested **longer sessions**, **modular pacing**, and **more theory integration**.

□ Pedagogical Implications

- **Low and Middle-level students benefited most**, confirming the software's scaffolding strength.
- **High-level students** requested more depth, suggesting a need for adaptive content layers.
- **HyperCard-based design** was effective in stimulating interest, planning, and conceptual change.
- **Metacognitive shifts** were evident in students' language and reasoning patterns.

□ Suggested Follow-Up

I can generate a VBA module that tracks individual student progression across Questions 1 & 6, maps explanation quality, and flags conceptual change based on wording shifts and test phase comparisons. This can support your didactic panel evaluations and ICASS/TVET reporting. Would you like me to scaffold that next?

:

Quantitative Gains in Conceptual Understanding

Question 1

- **Correct answers** increased from 78% to 100% (29% gain).
- **Correct explanations** rose from 63% to 100% (58% gain).
- **Mean score increase**:
  - Question 1: +20%
  - Explanation 1: +35.75%

Question 6

- **Correct answers** increased from 64% to 100% (56% gain).
- **Correct explanations** rose from 57% to 100% (74% gain).
- **Mean score increase**:
  - Question 6: +33.5%
  - Explanation 6: +41%

Interpretation: The software not only improved accuracy but also deepened students' ability to explain their reasoning—especially in areas prone to misconceptions like bulb location and resistance.

Diagnostic Insights

- **Sequential reasoning errors** were common in the pre-test, especially in Questions 1.b and 1.d.
- **Post-test and delayed-post test** responses showed:
  - Correct use of scientific terminology.
  - Adoption of software-provided language and analogies.
  - Homogenization of performance across Low, Middle, and High-level students.

Software Design Strategies That Worked

1. **Fixing the right category** without over-specifying meaning (Jung, 1985).

2. **Energy perspective**: Teaching circuits as systems where energy flows (Hartel, Steinberg).
3. **Distinguishing energy flow vs. electron flow** (Rhoneck & Volker, 1985).
4. **Mental model scaffolding**:
    - Target system → conceptual model → learner's mental model → scientific conceptualization.

These strategies helped students shift from intuitive or visual misconceptions to structured, scientific reasoning.

Student-Level Impact

Question	Low-Level Beneficiaries	Middle-Level Beneficiaries	High-Level Beneficiaries
1.b	10	3	—
1.d	10	2	—
Explanation 1.b	10	5	—
Explanation 1.d	10	3	1

Insight: Low-level students showed the greatest improvement, but Middle-level students also benefited significantly—especially in explanation quality.

Suggested Follow-Up

I can now generate a VBA module that tracks individual student gains across Questions 1 & 6, calculates percentage improvements, and flags conceptual shifts based on explanation quality and terminology changes. This module can support diagnostic reporting, remediation planning, and curriculum refinement. Would you like me to scaffold that next?

VBA Module: Conceptual Gains Tracker for Questions 1 & 6

vb

```
Sub TrackConceptualGains()
    Dim preCorrectQ1 As Integer, postCorrectQ1 As Integer
    Dim preExplainQ1 As Integer, postExplainQ1 As Integer
    Dim preCorrectQ6 As Integer, postCorrectQ6 As Integer
    Dim preExplainQ6 As Integer, postExplainQ6 As Integer
    Dim percentGainQ1 As Double, percentGainExplainQ1 As Double
    Dim percentGainQ6 As Double, percentGainExplainQ6 As Double
    Dim conceptualShiftFlag As String
```

```
    ' === Input Data ===
    preCorrectQ1 = 23
    postCorrectQ1 = 30
    preExplainQ1 = 19
    postExplainQ1 = 30
    preCorrectQ6 = 19
    postCorrectQ6 = 30
    preExplainQ6 = 17
    postExplainQ6 = 30

    ' === Calculate Percentage Gains ===
    percentGainQ1 = Round(((postCorrectQ1 - preCorrectQ1) / preCorrectQ1) *
100, 2)
    percentGainExplainQ1 = Round(((postExplainQ1 - preExplainQ1) /
preExplainQ1) * 100, 2)
    percentGainQ6 = Round(((postCorrectQ6 - preCorrectQ6) / preCorrectQ6) *
100, 2)
    percentGainExplainQ6 = Round(((postExplainQ6 - preExplainQ6) /
preExplainQ6) * 100, 2)

    ' === Flag Conceptual Shift ===
    If percentGainExplainQ1 >= 35 And percentGainExplainQ6 >= 40 Then
        conceptualShiftFlag = "Strong conceptual shift detected"
    ElseIf percentGainExplainQ1 >= 20 Or percentGainExplainQ6 >= 25 Then
        conceptualShiftFlag = "Moderate conceptual shift"
    Else
        conceptualShiftFlag = "Minimal shift — further support needed"
    End If

    ' === Output Summary ===
    MsgBox "□ Conceptual Gains Summary:" & vbCrLf & _
           "Question 1 — Correct Answer Gain: " & percentGainQ1 & "%" &
vbCrLf & _
           "Question 1 — Explanation Gain: " & percentGainExplainQ1 & "%" &
vbCrLf & _
           "Question 6 — Correct Answer Gain: " & percentGainQ6 & "%" &
vbCrLf & _
           "Question 6 — Explanation Gain: " & percentGainExplainQ6 & "%" &
vbCrLf & _
           "□ Diagnostic Insight: " & conceptualShiftFlag
End Sub
```

□ What This Module Captures

- Tracks gains in accuracy and explanation quality.
- Flags conceptual shifts based on thresholds.
- Supports remediation by identifying students needing further support.

I can now extend this module to include **student-level breakdowns**, **background knowledge tiers**, or **language shift detection** from pre- to post-test. Just say the word and I'll scaffold it for your didactic panel.

.

□ VBA Module: Conceptual Change Tracker for Questions 1 & 6

vb

```
Sub ConceptualChangeTracker()
    Dim studentName As String
    Dim preAnswerQ1 As Boolean, postAnswerQ1 As Boolean, delayedAnswerQ1 As
Boolean
    Dim preExplainQ1 As Integer, postExplainQ1 As Integer, delayedExplainQ1
As Integer
    Dim preAnswerQ6 As Boolean, postAnswerQ6 As Boolean, delayedAnswerQ6 As
Boolean
    Dim preExplainQ6 As Integer, postExplainQ6 As Integer, delayedExplainQ6
As Integer
    Dim wordingShiftQ1 As Boolean, wordingShiftQ6 As Boolean
    Dim conceptualChangeScore As Double
    Dim changeLevel As String

    ' === Sample Student Data ===
    studentName = "Student A"
    preAnswerQ1 = False
    postAnswerQ1 = True
    delayedAnswerQ1 = True
    preExplainQ1 = 1 ' scale: 0 = none, 1 = partial, 2 = complete
    postExplainQ1 = 2
    delayedExplainQ1 = 2
    wordingShiftQ1 = True

    preAnswerQ6 = False
    postAnswerQ6 = True
    delayedAnswerQ6 = True
    preExplainQ6 = 1
    postExplainQ6 = 2
    delayedExplainQ6 = 2
    wordingShiftQ6 = True

    ' === Conceptual Change Score Calculation ===
    conceptualChangeScore = 0
    If postAnswerQ1 And delayedAnswerQ1 Then conceptualChangeScore =
conceptualChangeScore + 1
    If postAnswerQ6 And delayedAnswerQ6 Then conceptualChangeScore =
conceptualChangeScore + 1
    If postExplainQ1 = 2 And delayedExplainQ1 = 2 Then conceptualChangeScore
= conceptualChangeScore + 1
    If postExplainQ6 = 2 And delayedExplainQ6 = 2 Then conceptualChangeScore
= conceptualChangeScore + 1
    If wordingShiftQ1 Then conceptualChangeScore = conceptualChangeScore +
0.5
    If wordingShiftQ6 Then conceptualChangeScore = conceptualChangeScore +
0.5

    ' === Classification of Conceptual Change Level ===
    Select Case conceptualChangeScore
        Case Is >= 5
```

```
            changeLevel = "High conceptual change"
        Case Is >= 3
            changeLevel = "Moderate conceptual change"
        Case Else
            changeLevel = "Low conceptual change"
    End Select

    ' === Output Summary ===
    MsgBox "🧠 Conceptual Change Report for " & studentName & vbCrLf & _
           "Q1 Answer Progression: " & preAnswerQ1 & " → " & postAnswerQ1 & "
→ " & delayedAnswerQ1 & vbCrLf & _
           "Q1 Explanation Quality: " & preExplainQ1 & " → " & postExplainQ1
& " → " & delayedExplainQ1 & vbCrLf & _
           "Q6 Answer Progression: " & preAnswerQ6 & " → " & postAnswerQ6 & "
→ " & delayedAnswerQ6 & vbCrLf & _
           "Q6 Explanation Quality: " & preExplainQ6 & " → " & postExplainQ6
& " → " & delayedExplainQ6 & vbCrLf & _
           "Wording Shift Detected: Q1=" & wordingShiftQ1 & ", Q6=" &
wordingShiftQ6 & vbCrLf & _
           "📈 Conceptual Change Level: " & changeLevel
End Sub
```

🧠 What This Module Captures

- Tracks progression of correct answers and explanation quality across phases.
- Flags wording shifts as indicators of metacognitive change.
- Calculates a conceptual change score and classifies impact level.
- Can be extended to loop through multiple students or export diagnostic summaries.

I can now scaffold this into a full diagnostic dashboard or integrate it with your ICASS moderation tables. Just let me know how you'd like to expand it.

.

🧠 VBA Module: Conceptual Readiness & Engagement Tracker

vb

```
Sub TrackConceptualReadiness()
    Dim studentName As String
    Dim timeOnSoftware As Double ' in minutes
    Dim preMisconceptions As Integer
    Dim postMisconceptions As Integer
    Dim explanationQuality As Integer ' scale: 0 = none, 1 = partial, 2 =
complete
    Dim readinessIndex As Double
    Dim engagementLevel As String
    Dim recommendation As String

    ' === Sample Student Data ===
```

```
    studentName = "Student A"
    timeOnSoftware = 42 ' minutes
    preMisconceptions = 4
    postMisconceptions = 1
    explanationQuality = 2

    ' === Readiness Index Calculation ===
    Dim misconceptionCorrection As Double
    misconceptionCorrection = preMisconceptions - postMisconceptions
    If misconceptionCorrection < 0 Then misconceptionCorrection = 0

    readinessIndex = Round((timeOnSoftware * 0.3 + misconceptionCorrection *
20 + explanationQuality * 25) / 100, 2)

    ' === Engagement Classification ===
    If timeOnSoftware >= 60 Then
        engagementLevel = "High"
    ElseIf timeOnSoftware >= 30 Then
        engagementLevel = "Moderate"
    Else
        engagementLevel = "Low"
    End If

    ' === Recommendation Logic ===
    If readinessIndex >= 0.8 Then
        recommendation = "Ready for advanced content"
    ElseIf readinessIndex >= 0.5 Then
        recommendation = "Continue with current module; reinforce
explanations"
    Else
        recommendation = "Schedule extended sessions and provide remedial
support"
    End If

    ' === Output Summary ===
    MsgBox "□ Conceptual Readiness Report for " & studentName & vbCrLf & _
           "Time on Software: " & timeOnSoftware & " minutes (" &
engagementLevel & " engagement)" & vbCrLf & _
           "Misconceptions Corrected: " & misconceptionCorrection & vbCrLf &
_
           "Explanation Quality: " & explanationQuality & " (0=None,
1=Partial, 2=Complete)" & vbCrLf & _
           "□ Readiness Index: " & readinessIndex & vbCrLf & _
           "□ Recommendation: " & recommendation
End Sub
```

□ What This Module Captures

- **Time-on-task** as a predictor of learning outcomes.
- **Misconception correction** as a core metric of conceptual change.
- **Explanation quality** as a proxy for metacognitive development.
- **Readiness index** to guide differentiated instruction and support.

I can now extend this to loop through multiple students, export results to a dashboard, or integrate it with your ICASS/TVET moderation tables. Just say the word and I’ll scaffold the next layer.